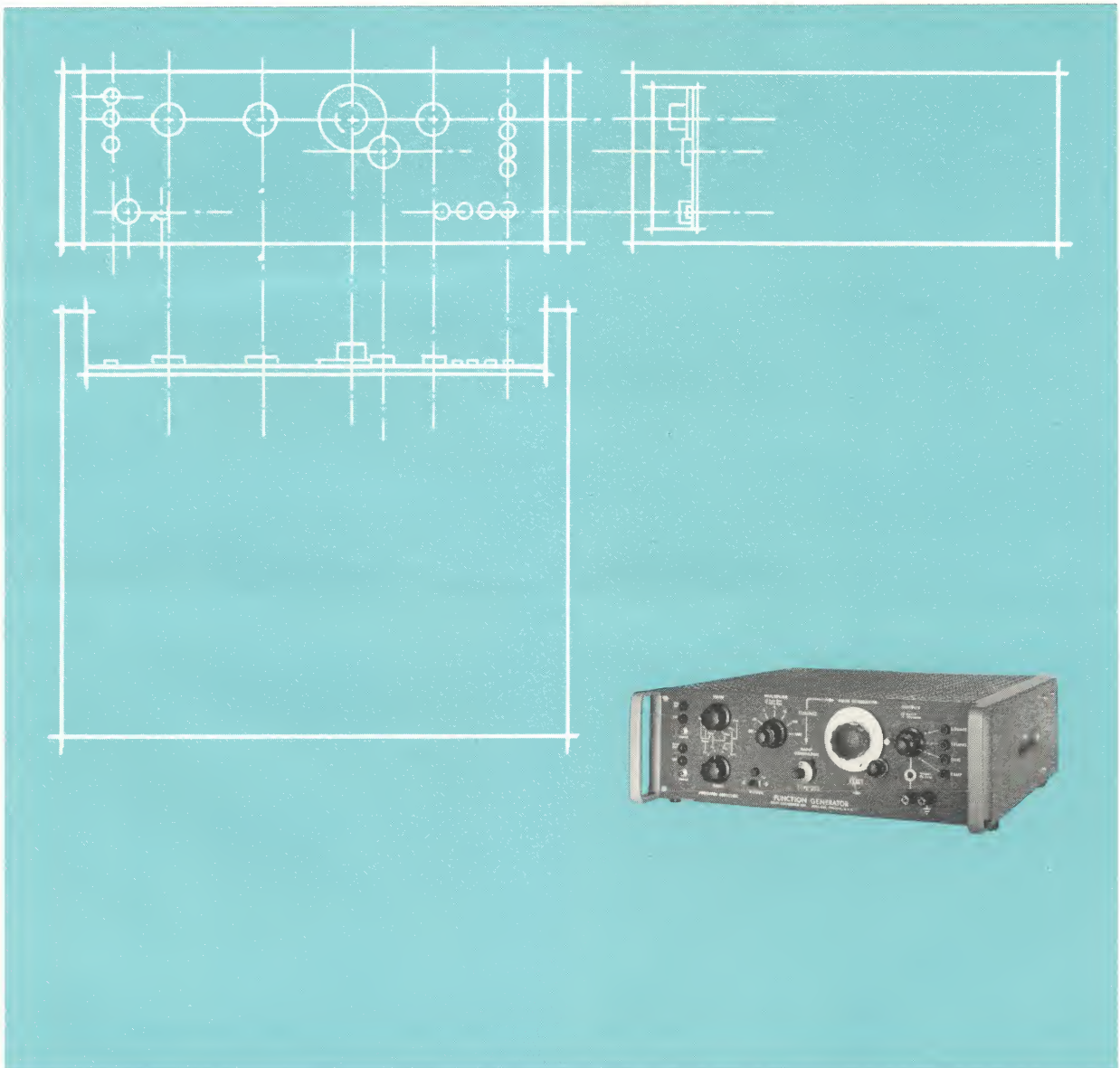




200 SERIES

Function Generators





ABOUT FUNCTION GENERATORS...

OUTPUTS

SQUARE, TRIANGLE, SINE, RAMP and COSINE waveforms are all available in different combinations, in Exact Function Generators. An important feature of Exact instruments is that all outputs are always simultaneous and synchronized. Each separate waveform is available at an auxiliary output and also available as a selection at the main output. Triggered outputs are also simultaneous, as are trigger-output signals. The basic Function Generator, the 240, has four separate outputs. The most advanced Function Generator, the 255, has seven separate outputs. The 252 has five sine-wave outputs alone, plus three additional outputs for a total of eight available waveforms. Typical specifications are: 99.5% linearity, less than 2% overall distortion, better than 1% long-term frequency stability, and 0.5% amplitude stability. Power supplies are regulated to better than 0.01%. Auxiliary outputs are of fixed amplitude, 30 volts p-p typically. The selectable-waveform output (MAIN) is of adjustable amplitude, up to 25 volts p-p. Some models have adjustable dc reference level at the main output.

FREQUENCY

0.001 cps to 10 kc is the standard frequency for all Exact 200 Series Function Generators. The -03 factory modification can be incorporated and changes the frequency range to 0.0001 to 1000 cps. The Type 250, the most popular model, produces ramp waveforms with duration adjustable from 100 usec to over 16 minutes (0.001 to 10,000 cps frequency range), a 10^7 frequency spread.

TRIGGERING

All Exact Function Generators, except the 240, can be externally triggered. Each input trigger pulse produces one complete cycle at every output simultaneously. Triggered square, triangle, and sine waveforms can be shifted (internal adjustment) to start anywhere between -85° and +85° of the standard starting point. All triggered outputs occur simultaneously and complete one full cycle (360°) for every input trigger pulse.

FACTORY MODIFICATIONS

Standard factory modifications are available for all models. For example, gated operation can be installed in a 250 or 251. Rackmount versions are available in all models, at no additional cost. The following list are those standard modifications currently available. For further information concerning these, and possibly other modifications, consult the nearest Exact representative. -RM- Rackmount version, 5-1/4" rack panel. -01- Output dc balance control provided, balances out reference level shift as amplitude is changed. -02- Gated operation is provided in addition to external triggering mode. -03- 10X slower timing. -04- Terminal strip connectors provided at rear of cabinet. -05- Main output is push-pull balanced output. -06- Painted panel available with any customer supplied paint.

PHYSICAL CHARACTERISTICS

All Exact Series 200 Function Generators are 5-1/4" high by 13" deep. The width varies depending on model. The widest (255) is less than 17" wide. Weight is from 17lbs to 21lbs, depending on model. Exterior finishes are oven baked for durability. Front panels are dark grey in color and cabinets are medium grey. Front panel designations are silkscreened white for ease in locating and reading.

SIX MODELS...

TYPE 240 FUNCTION GENERATOR

The Type 240 is a "basic" Function Generator which produces square, triangle and sine waveforms, simultaneously. A separate (MAIN) output is switched to provide any one of the three waveforms, with adjustable amplitude and reference level. The MAIN output can be referenced to chassis or circuit ground.

TYPE 240M FUNCTION GENERATOR

The Type 240M is identical to the Type 240 with the addition of a trigger output signal and a balanced push-pull MAIN output. The 240M is primarily intended for applications such as military installations, where a general purpose waveform generator of nominal flexibility is required.

TYPE 250 FUNCTION GENERATOR

The Type 250 is a four-waveform instrument (square, triangle, sine and ramp) which can be triggered or operated free-running. Each input trigger pulse produces one complete cycle at all outputs. A pushbutton permits manual triggering of all outputs for one-shot applications. Each waveform is available at an auxiliary output while, like the 240, a MAIN output is switched to the desired waveform with amplitude and reference level adjustable. Also, a trigger output pulse train is provided for synchronizing external equipment.

TYPE 251 FUNCTION GENERATOR

The Type 251 is identical to the 250 with the addition of a simultaneous cosine waveform available as an auxiliary output and a selectable waveform at the MAIN output. The cosine waveform leads the sine waveform by 90°.

TYPE 252 FUNCTION GENERATOR

The 252 produces four fixed-phase sine waveforms at 0°, 90°, 180° and 270°, and an adjustable-phase sine waveform adjustable from 0° to 360° (MAIN output). The MAIN output is a pushpull balanced configuration. Also, the 252 produces auxiliary square and triangle waveforms. All outputs are simultaneous and can be free-running or externally triggered at one complete cycle at every output per input trigger pulse. Also, a trigger output is provided for synchronizing other equipment.

TYPE 255 FUNCTION GENERATOR

The 255 Function Generator consists of two separate generators: a main generator which produces square, triangle, and sine waveforms; and a ramp generator which produces ramp waveforms. The two generators are completely independent, having separate timing and multiplier (frequency) controls. Front panel switches permit cross-connecting input/output signals between both generators, providing many gating, pulsing and delaying modes of operation. Both generators can be externally triggered. The main generator can be gated by the ramp generator. Either generator can be selected to trigger the other. A dc holdoff control varies the starting point of triggered or gated square, sine and triangle waveforms over nearly 180°. Also, the main generator provides a trigger output signal, and the ramp generator provides a gate output signal. All outputs are simultaneous and the main output (adjustable amplitude) is switched to provide square, triangle, sine or ramp waveform output.

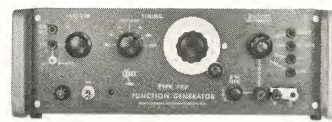
WARRANTY

All Exact instruments are fully warranted against defective materials or workmanship for one year. Responsible maintenance centers are located in major cities.

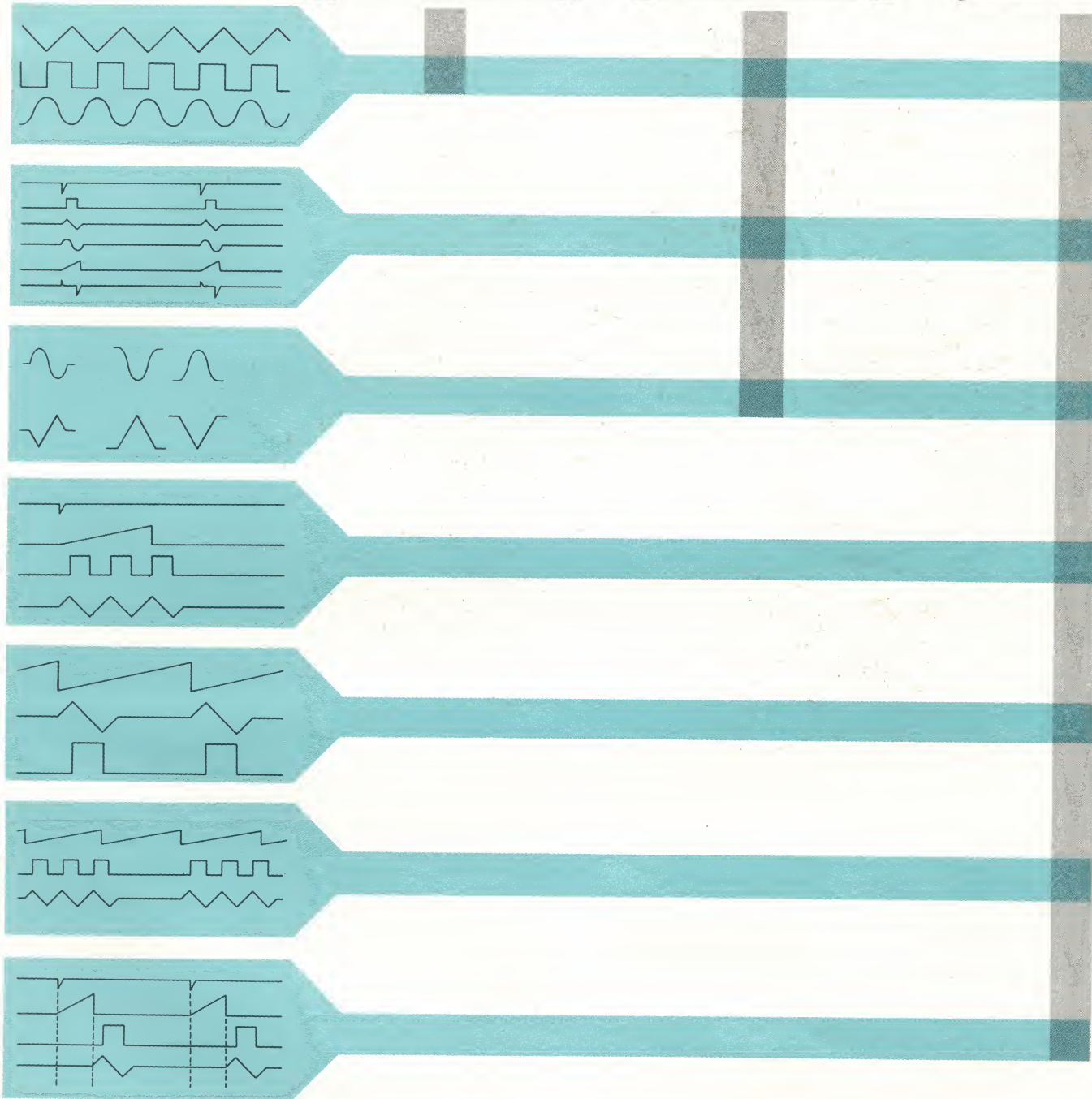
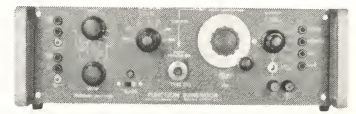
TYPE 240



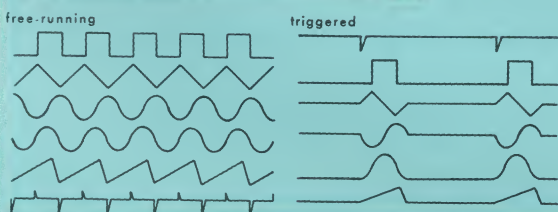
TYPE 250



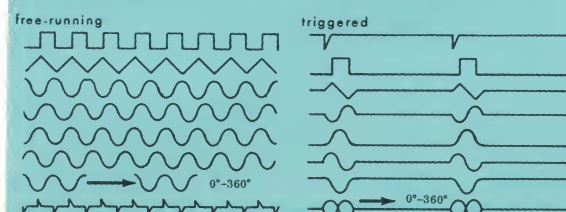
TYPE 255



TYPE 251



TYPE 252



NEW!

300 Series Solid-State Function Generators

1 MEGACYCLE

Square, triangle and sine waveforms... simultaneously, at 0.001 cps to 1 megacycle. Free-running, externally triggered and gated modes. Entirely solid state, the 300 series Function Generators occupy less than 1/4 cubic foot and weigh only a few pounds. All circuitry is on plug-in printed-circuit boards (low maintenance). The 300 series high frequency Function Generators are ideally suited for many applications where special test equipment would normally be required. Please keep in contact with your local representative for additional information.

Complex Waveform Generator



Construct your own complex waveforms. This instrument electronically builds complex waveforms by independently controlling the parameters of up to 50 sequential segments of an output waveform. Output waveforms can be adjusted from 33 microseconds to over one minute duration. Write for details on this "any function" generator: the TYPE 200 WAVEFORM SYNTHESIZER, with TYPES C, D, E, and F Plug-In Units.

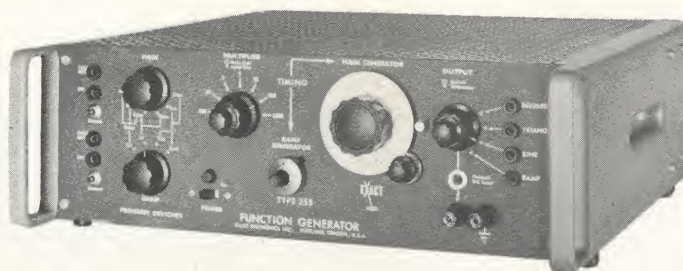


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455 S.E. 2nd Avenue, Hillsboro, Oregon 97123

printed in U.S.A.

TYPE 255 FUNCTION GENERATOR



TYPE 255 FUNCTION GENERATOR

- * SEPARATE RAMP TIMING
- * SIMULTANEOUS OUTPUTS
- * SQUARE-TRIANGLE-SINE-RAMP
- * 0 to 25 VOLTS P-P
- * 0.001 CPS to 10 KC
- * TRIGGER/GATE/DELAY MODES

TYPE 255 FUNCTION GENERATOR

The Type 255 is the most flexible of Exact Function Generators. Basically, it consists of two completely independent generators ... a MAIN generator which produces simultaneous square, triangle and sine waveforms, and a RAMP generator which produces ramp waveforms. The two generators have separate timing and multiplier (frequency) controls. The MAIN generator can be externally triggered and provides a separate trigger output signal. The RAMP generator can also be externally triggered and provides a trigger output (GATE) signal. Two mode switches interconnect input/output trigger waveforms between both generators, providing many gating, pulsing, and delaying modes of operation. The 255 is ideally suited as a general purpose instrument in laboratories where flexibility is a must ... where free-running, pulsed, burst and other waveform patterns are required.

SEPARATE RAMP GENERATOR

Separate frequency controls allow independent adjustment of ramp time base from 100 μ secs to over 16 minutes. The ramp generator can be operated free-running, externally triggered, or triggered by the main generator. When the ramp is triggered by the main generator, ramp duration and off-time between ramp waveforms are separately adjustable.

TRIGGER/GATE/DELAY OPERATION

The 255 provides many different modes of triggered, gated and delayed operation. Figures three through nine show some of the available outputs. Either generator (main or ramp) can be externally triggered and the output used to delay-trigger the other generator. Also, the ramp generator can gate the main generator to produce a burst of square, triangle, and sine waveforms.

MAIN OUTPUT

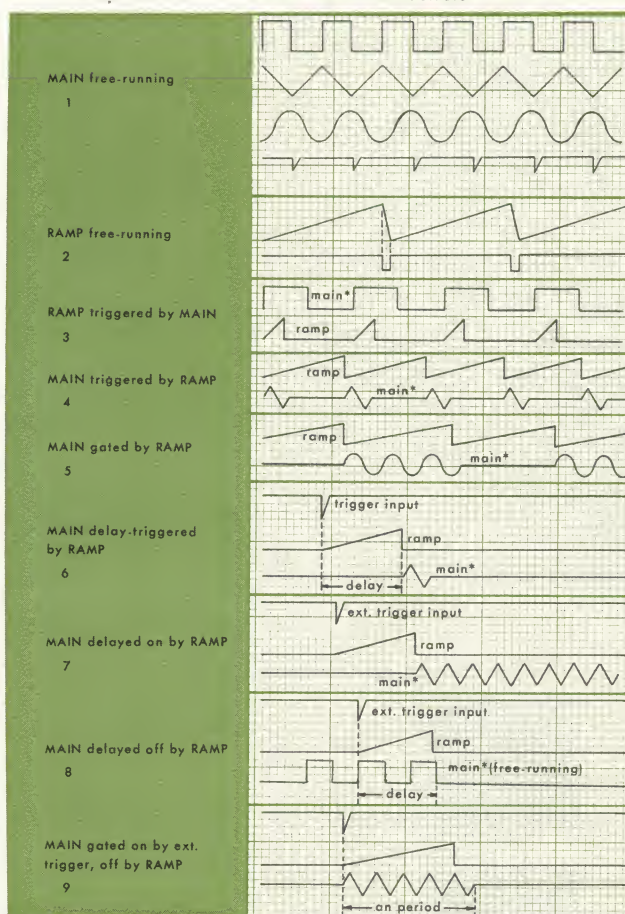
The main output is switched to provide square, triangle, sine or ramp waveforms with amplitude adjustable from 0 to over 25 volts p-p. Dc reference level is fixed at 0 volts, and is the center of the square, triangle and sine waveforms and the base of the ramp waveform. The HOLDOFF DC LEVEL control permits shifting the starting point of triggered sine and triangle waveforms from 0° to more than 170° (triggered and gated waveforms are completed at 360° from the starting point).

PACKAGING

The 255 is 5-1/4" high by 16-3/4" wide, and weighs only 23 lbs net. The 255 can be supplied in rackmount version (255RM) at no additional cost. Front panel is dark grey in color, with silk-screened white callouts. End bells and cabinet are medium grey. All exterior finishes are oven baked for durability.

MODE OF OPERATION

TYPICAL OUTPUTS

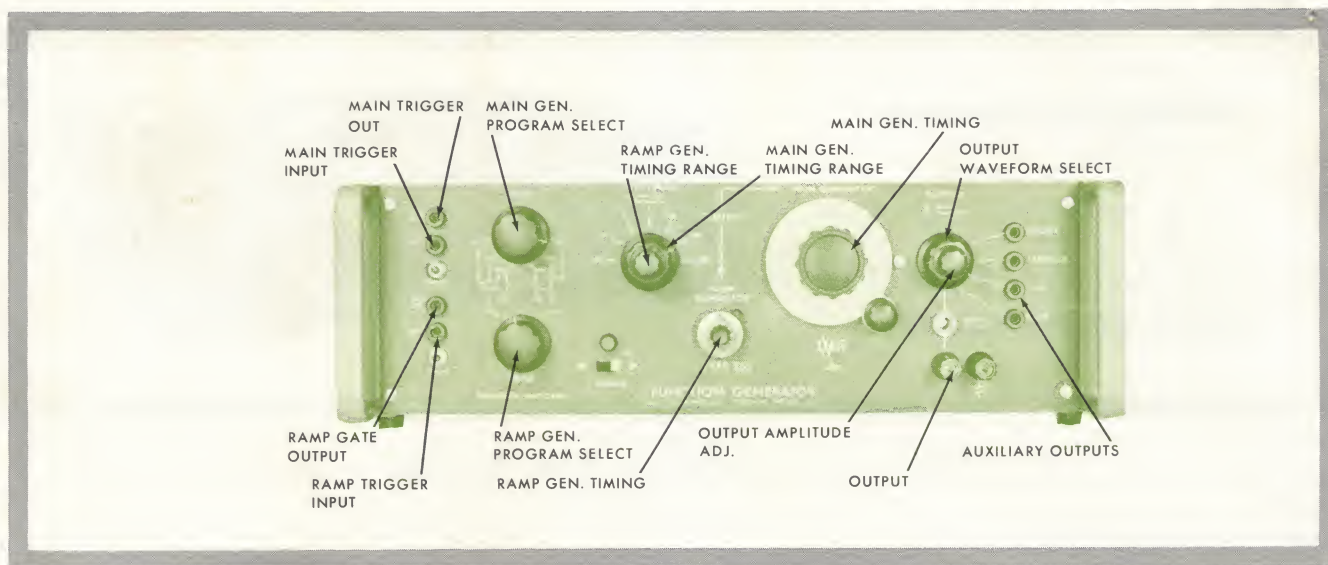


*MAIN output can be either square, triangle or sine waveforms



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SPECIFICATIONS

MAIN OUTPUT

Amplitude 0 to 25 volts p-p (min)
 25 volts into 5K load
 Stability/Repeatability 50 mv (10 min), 300mv(24 hrs)
 Amplitude Change with Frequency 0.5% to 1 kc
 1% to 10 kc
 Amplitude Change with Function 2% max
 DC Reference Level 0 volts
 Frequency Range 0.001 cps to 10 kc
 Frequency Deviation from Absolute 3% max
 Long Term Frequency Stability $\pm 1\%$

EXTERNAL TRIGGERING

Trigger Input Pulse 1 usec risetime (min)
 -10v min amplitude
 less than 1 usec delay between
 -10v point and start of waveform

TRIGGER OUTPUT

Waveform differentiated squarewave
 Amplitude -25 volts(min)

GATE OUTPUT

Amplitude 35 volts
 Frequency Synchronized with ramp

POWER REQUIREMENTS

Line Voltage 105 to 125 or 200 to 250 vac
 Line Frequency 50 to 400 cps
 Power 175 watts

PHYSICAL CHARACTERISTICS

Weight 21 lbs net, 28 lbs gross

Volume 2 cu ft gross
 Dimensions 16-3/4w X 5-1/4h X 13d

SQUARE WAVEFORM

Risetime 5 usecs or faster
 Symmetry 99.5%
 Overshoot 1% max
 Droop 1% max

TRIANGLE WAVEFORM

Linearity 99.5%
 Symmetry 99.5%

SINE WAVEFORM

Total Distortion Less than 2% over entire
 frequency range

RAMP WAVEFORM

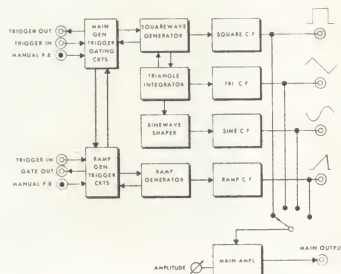
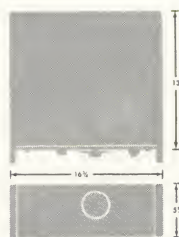
Linearity 99.5%
 Fall Time 1% to 5 kc
 1.5% to 10 kc
 Timing Dial Accuracy $\pm 1\%$ of absolute
 Dead Time Less than 0.1% of period

AUXILIARY OUTPUTS

Amplitude 30 volts p-p (min)
 30 volts into 7K load
 Stability/Repeatability Same as main
 Amplitude Change with Frequency Same as main
 DC Reference Level Same as main
 Frequency Range Same as main

PRICE

F.O.B. Factory \$ 785.00



For the location of your
 nearest representative,
 consult Electronic Engineers
 Master.

Form File 2900



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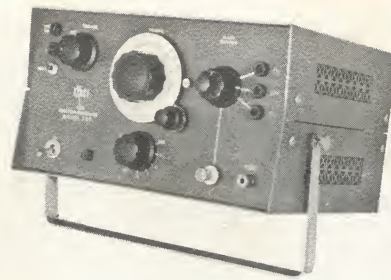
455 S.E. 2nd Avenue, Hillsboro, Oregon 97123

Telephone (503) 648-6661

TWX: 503-821-6927

TYPE 301

Solid State FUNCTION GENERATOR



TYPE 301 FUNCTION GENERATOR. Here's an all solid state Function Generator that simultaneously produces four separate outputs. Three of the outputs are fixed amplitude square, triangle, and sine waveforms. The fourth output (MAIN) is switched to provide any of the three waveforms, with adjustable amplitude. The 301 is a reliable high frequency Function Generator for use in circuit design, equipment checkout and calibration, and in quality control applications.

OPTIONAL MAIN OUTPUT DC LEVEL CONTROL.

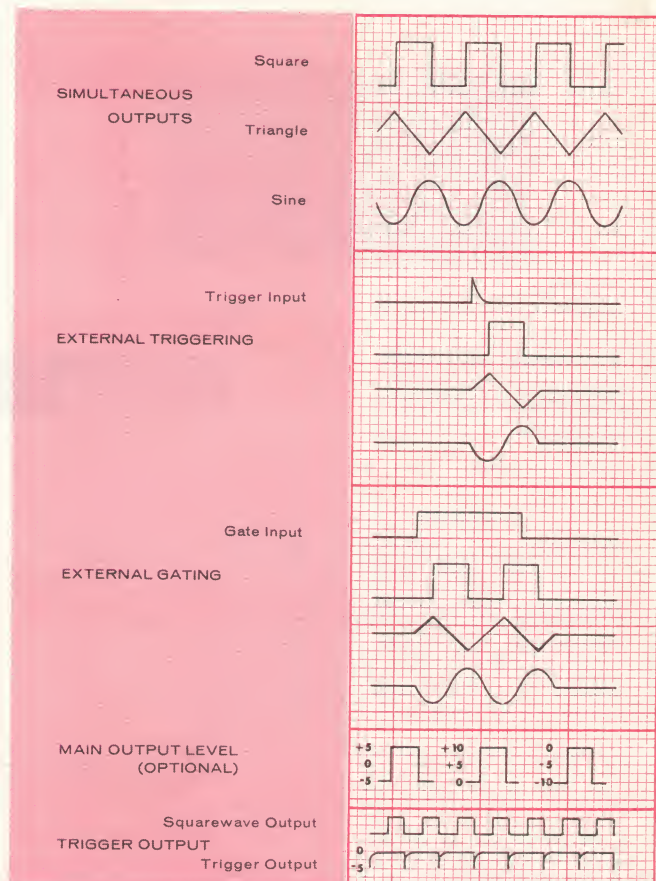
This optional addition to the 301 provides a front panel control which enables the main output waveform dc level (center of square, triangle, and sine waveforms) to be adjusted between -5 and +5 volts or in the switched position, set to approximately 0 volts.

SIMULTANEOUS OUTPUTS. All of the outputs are simultaneous and synchronized throughout the frequency range. Phase relationship is unique in that the triangle and sine waveform peaks occur at the rise and fall points of the square waveform.

EXTERNAL TRIGGERING/GATING. The 301's flexibility is best demonstrated when operated in the externally-triggered mode. In this mode, one trigger pulse produces one complete cycle at all outputs, simultaneously. A pushbutton permits manual triggering of the outputs for one-shot applications. Triggered waveforms are adjustable (timing controls) from 1 microsecond to over 16 minutes duration. Also, gated operation is available. In this mode, all outputs are simultaneously generated while the input gate-level is present, with automatic last cycle completion when the input gate-level is removed.

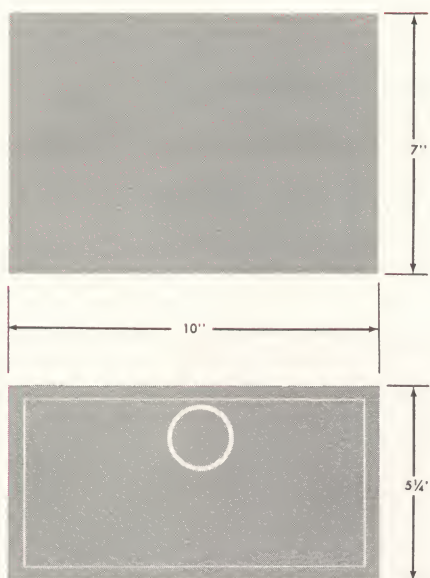
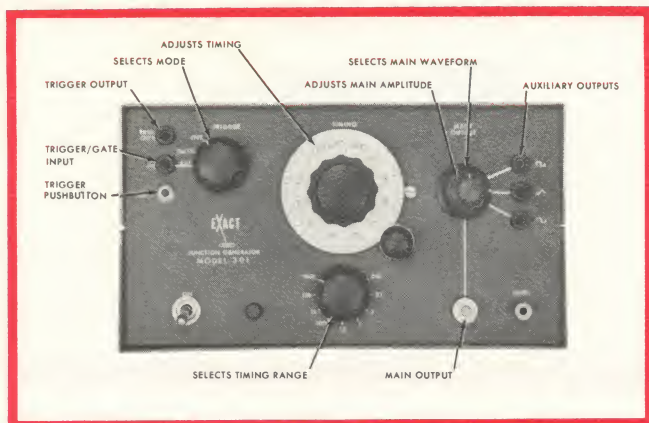
PACKAGING. The 301 is approximately 5-1/4" high by 10" wide, and weighs only eight lbs net. Front panel is dark grey in color, with silkscreened white callouts. Cabinet is medium grey. All exterior finishes are oven baked for durability.

- * ALL SOLID STATE
- * 10 NANOSECOND RISETIME
- * SIMULTANEOUS OUTPUTS
- * SQUARE-TRIANGLE-SINE
- * 0.001 cps to 1mc-ALL WAVEFORMS
- * 10 volts P-P into 52 ohms
- * TRIGGERED & GATED MODES



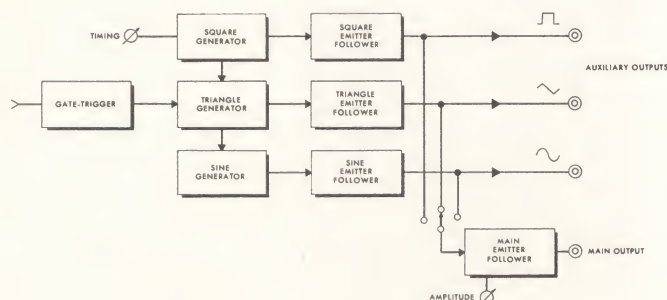
EXACT ELECTRONICS INC.

455 S.E. 2nd Avenue, Hillsboro, Oregon 97123



For location of your nearest representative, consult Electronic Engineers Master.

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TENTATIVE SPECIFICATIONS

OUTPUT FREQUENCY

Frequency Range..... 0.001 cps to 1 megacycle (9 ranges)
Indicated Frequency Accuracy..... Within 3% of absolute
Frequency Stability..... Short term (10 min.) 0.1%
..... Long term (24 hrs.) 1%
Frequency Response (Sine)..... Within 0.2 db to 100 kc
..... 0.5 db to 1 mcs

AUXILIARY OUTPUT

Amplitude (All Waveforms)... 12 v P-P min. into 500 ohms
Output Impedance..... Terminated at 500 ohms
DC Reference Level..... 10 volts fixed ± 10 mv

NOTE: The Auxiliary output is current protected.

MAIN OUTPUT

Amplitudes (All Waveforms)... At least 10 v P-P (variable)
..... into 52 ohms
Output Impedance..... Terminated at 52 ohms
DC Reference Level..... 0 volts fixed ± 10 mv
Hum and Noise..... Greater than 80 db down
DC Stability
Short term (10 min.) Long term (24 hrs.)
Square..... ± 15 mv ± 30 mv
Triangle..... ± 15 mv ± 30 mv
Sine..... ± 25 mv ± 50 mv
Amplitude Stability..... Short term (10 min.) 0.2%
..... Long term (24 hrs.) 2%

SQUARE WAVEFORM

Risetime..... 10 nanosecs or faster
Symmetry..... 99% to 100 kcs, 98% to 1 mcs
Overshoot..... 2% max. (correctly terminated)
Drop..... 2% max. (correctly terminated)

TRIANGLE WAVEFORM

Linearity..... 99% to 100 kcs, 98% to 1 mcs
Symmetry..... 99% to 100 kcs, 98% to 1 mcs

SINE WAVEFORM

Distortion..... Less than 1.5% to 20 kcs
..... Less than 2.5% to 1 mcs

TRIGGERING and GATING

Trigger or Gate Signal..... On + 5 volts (approx.)
..... Off + 2 volts (approx.)
Maximum Gate Signal..... + 30 volts
Gate Repetition Rate..... 990 kcs (max)

NOTE: The above measurements are made after a min. warm up time of 10 minutes.

TRIGGER OUTPUT

Waveshape.... Differentiated squarewave (negative-going)
Timing..... Coincident with squarewave output
Risetime..... 50 nanoseconds (max)
Amplitude..... 5 volts peak (min)
Source Impedance..... 300 ohms

POWER REQUIREMENTS

Line Voltage..... 95 to 130 or 190 to 260 v ac
Line Frequency..... 50 to 400 cps
Power..... Less than 15 watts

PHYSICAL CHARACTERISTICS

Weight..... 6 lbs. net, 13 lbs. gross
Volume..... 0.2 cu. ft. gross
Dimension..... 10 w x 5-1/4 h x 7 d

PRICE FOB FACTORY

Cabinet Model (301)..... \$550.00
Rack-Mounting Model (301 RM) \$550.00
Adjustable DC Reference Level Option..... \$ 25.00



EXACT ELECTRONICS INC.

455 S.E. 2nd Avenue, Hillsboro, Oregon 97123

Telephone (503) 648-6661

TWX: 503-821-6927

Prices and specifications subject to change without notice.

STANDARD CATALOG MODIFICATIONS

Mod. #	PRICE	DEL. ADD	DESCRIPTION
01	\$35 (240-250-251) \$50 (255)	2 WEEKS 2 WEEKS	<u>ZERO OUTPUT</u> - LESS THAN 100MV OUTPUT WITH DC COMPENSATION. INCORPORATES \pm DC BALANCE FEATURES ON TYPE 255.
02	\$65	2 WEEKS	<u>GATE MODIFICATION</u> - COMBINES THE FEATURES OF GATED AND TRIGGERED OPERATIONS AND OFFERS BOTH.
03	\$35 (TYPE 240) \$65 (TYPE 250) \$75 (TYPE 255)	2 WEEKS 2 WEEKS 2 WEEKS	<u>TIMING 10X SLOWER</u> - THIS MODIFICATION SHIFTS THE TIMING RANGE FROM .001cps-10KC TO .0001cps-1KC.
04	\$20	2 WEEKS	<u>REAR OUTPUTS</u> - THIS MODIFICATION EXTENDS NORMAL FRONT PANEL OUTPUTS TO THE REAR OF THE UNIT TERMINATING ON A CINCH-JONES TYPE BARRIER STRIP.
05	\$50	2 WEEKS	<u>BALANCED OUTPUT</u> - THIS MODIFICATION GIVES A BALANCED PUSH-PULL OUTPUT FOR THE MAIN OUTPUT ONLY.
06	\$10	2 WEEKS	<u>SPECIAL PAINTED PANELS</u> - CUSTOMER SUPPLIES PAINT TO BE USED OR FEDERAL CODE NUMBER.
07	N/C	2 WEEKS	<u>EXPORT VOLTAGE</u> - 220, 230 OR 234 VOLTAGE MUST BE SPECIFIED BY CUSTOMER.
10	N/C	1 WEEK	<u>RACKMOUNT PANELS</u> - CONNECTS ALL UNITS TO 19" RACK MOUNT.
11	\$75 \$105 (TYPE 255)	2 WEEKS 2 WEEKS	<u>SLIDE MOUNT</u> - AVAILABLE ONLY ON RACKMOUNTED INSTRUMENTS. STANDARD SLIDES USED -- ACCURIDE M311-113 S.H., NON-TILT FOR THE TYPES 240, 250, 251 AND 252 AND CHASSIS-TRAK MODEL CTN NON-TILT FOR THE TYPE 255.

STANDARD CATALOG MODIFICATIONS ARE AVAILABLE AS FOLLOWS:

TYPE 240 -- 01, 03, 04, 05, 06, 07, 10 AND 11.

TYPE 250 -- 01, 02, 03, 04, 05, 06, 07, 10 AND 11.

TYPE 251 -- 01, 02, 04, 05, 06, 07, 10 AND 11.

TYPE 255 -- 01, 03, 04, 05, 06, 07, 10 AND 11.

NOTE: COMBINATIONS OF CATALOG MODIFICATIONS OTHER THAN THE ABOVE AND CUSTOMER ORIENTED MODIFICATIONS (99 TYPE MODIFICATIONS) ARE AVAILABLE UPON REQUEST. PRICES AND SHIPMENT MUST BE NEGOTIATED WITH THE FACTORY.

THANK YOU

for your interest in *Exact Electronics, Inc.* products. The information you requested is enclosed. If you would like more information, or if you want our applications engineer to call, please use the enclosed reply card.

For your convenience, Exact Electronics engineering representatives are located throughout the country as listed on the reverse side.



P. O. Box 160
455 S. E. Second Ave.
HILLSBORO, OREGON 97123

Phone
648-6661
Area Code 503

- | | |
|--|--|
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| <input type="checkbox"/> Function Generators | |
| <input type="checkbox"/> Waveform Synthesizers | |
| <input type="checkbox"/> Calibrators | |
| <input type="checkbox"/> _____ | |

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Mail Station _____

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